MixW RigExpert

User's manual

IMPORTANT:

Read this manual carefully before attempting to use the MixW RigExpert device.

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MixW RigExpert
USB Transceiver Interface

MixW RigExpert is an electronic device designed to operate phone, CW, and digital modes using personal computer and transceiver. Previously, a TNC or sound card was needed for this purpose, along with lots of cables, occupying computer serial ports. All of this is not needed anymore. Following up-to-date technology, USB interface is chosen to connect MixW RigExpert to a computer. For convenience and simplicity, the MixW RigExpert box contains no switches or other adjustment elements. Also, no additional interface circuit needed for transceiver connection.

MixW RigExpert combines:

- Transceiver audio interface for operating digital modes, voice recording and playback.
- CAT (Computer Aided Transceiver) system, which controls transceiver frequency, mode and other functions by computer, supporting various models of transceivers.
- FSK operation to get crystal-clear RTTY signal.
- Built-in electronic CW keyer.

Imagine a bulk of different black boxes with lamps and switches, a dozen of cables hanging down the table. This gloomy picture is well-known for a ham who prefers computer-assisted contesting or simply wants to check out digital modes. He spends a lot of money buying all this stuff, and then a lot of aspirin is needed to soften his headache while hooking it up to transceiver and computer and trying to start up the whole system...

MixW team have done their best to make MixW RigExpert a breakthrough into the new era. Along with world-beater MixW software, it is a reconsideration of style a ham radio operator's workplace may be organized.

For a novice, it is a first ever chance to make sure operating digital modes is really easy. It lets experienced DX-men and contestmen enjoy the power of modern technology. Portable operators will appreciate its simplicity and reliability. At last, new horizons are open for experimenters.

MixW RigExpert features:

- Along with MixW software, operates phone, CW, PSK31, RTTY, Packet, AMTOR(FEC), MFSK, THROB, MT63, Hellschreiber, SSTV, receives PACTOR and fax images - all in one!
- Any other soundcard software may be used under Windows 2000/XP. Windows 98/ME drivers are under development.
- Windows 98/ME/2000/XP and Linux compatible.
- No TNC required.
- Makes free computer soundcard and COM ports previously used for operating digital modes.
- USB connection to computer.
- If using USB hub or repeater, long (up to 20 meters) cable may be used.
- Single 25-pin connector for transceiver connection.
- CAT interface tested with Icom, Kenwood, Yaesu and Ten-Tec transceivers.
- The device is able to work with any future type of transceiver.
- Transformer coupled audio input and output to minimize interference.
- Precise and stable input and output audio sample rate.
- Ergonomic light plastic case.
- Comprehensive documentation and support.

Internet links

www.mixw.net/RigExpert/ - fresh news and updates
www.mixw.co.uk - KMK UK Limited, UK
www.rigexpert.de - Germany
www.rigexpert.net – UZ tech, Canada
www.rigexpert.com - USA

Description

MixW RigExpert is a device for operating phone, CW and digital modes using personal computer with USB port. It provides:

- Transceiver audio interface

  Audio interface is a connection to transceiver audio output (external speaker connector or line output) and transceiver audio input (microphone connector or line input). Audio interface enables operating digital modes, recording and playing voice, as well as other useful functions (such as measuring levels of a signal from the air) by using a computer.

- CAT interface for various transceiver models

  CAT (Computer Aided Transceiver) system provides control of transceiver frequency, operating mode and other functions by computer software. Normally, modern transceivers have serial (with various signal levels) link providing CAT interface.

- FSK output

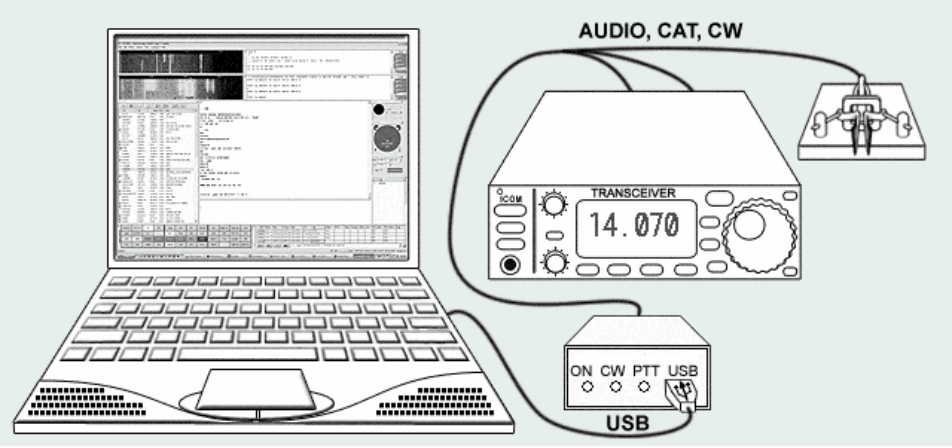
  FSK (Frequency Shift Keying) is a popular method of transmitting digital messages over radio primarily used in radioteletype (RTTY) mode. Most transceivers provide FSK modulator feature to make the RTTY signal stable and clear.

- PTT and CW keyer functions

  Transceivers provide PTT (Push To Talk) and CW (Continuous Wave) keyer inputs to allow setting the transmitter on or off and operating CW using external device (PTT pedal, CW bug or paddle, terminal node controller, or personal computer).

- Built-in electronic CW keyer for single or double paddle

  The keyer produces dots or dashes depending on the direction a paddle is pushed to. If using double paddle, squeezing both paddles gives alternating dots and dashes. The speed a CW message comes out with is set by computer software.



Typical MixW RigExpert connection

MixW RigExpert is primarily designed for MixW and DigiPan software. However, under Windows 2000/XP it works with any other sound card software using the *READUDIO virtual sound card driver.*

Specifications

General features

- Transceiver audio interface for operating digital modes, voice recording and playback
- CAT (Computer Aided Transceiver) system
- FSK output
- Built-in electronic CW keyer

Computer connection

- USB (Universal Serial Bus) connector
- Powered from the USB port (consuming 100 mA maximum)
- No external power supply needed

Transceiver connection

- Single 25-pin connector for transceiver cable
- Various transceiver models supported

Audio interface

- Insulated from digital nets
- Maximum input/output amplitude is 1V
- Input/output samplerate: 10.417 kHz or 15.625 kHz ±10ppm
- True 16-bit DAC/ADC used

CAT serial port

- Baudrate: 1200-57600 baud
- Electrical compatibility: RS-232, CI-V, TTL or inverted-TTL

PTT/CW outputs

- PTT output: open collector and TTL-level
- CW output: open collector
- Maximum current is 50 mA

FSK output

- Open collector and TTL-level

LEDs on the front panel

- “ON” – device power indicator
- “CW” – CW output indicator
- “PTT” – push-to-talk indicator

System requirements

- Desktop or laptop Pentium computer with USB 1.1 or USB 2.0 compliant port
- Windows 98/ME/2000/XP/2003 operating system
- Linux or MAC OS 8/9/X supported (additional drivers required)
- MixW 2 software or any other soundcard software with REAUDIO driver

There are several steps needed to get ready to operate using MixW RigExpert device:

1) Plug the MixW RigExpert device into the computer's USB port using supplied USB cable. The "ON" indicator on the device front panel should light up.

2) Install the Virtual Communication Port drivers. See the following Driver Installation Guides depending on your operating system version (pages 7, 8 of this manual).

   The Virtual Communication Port (VCP) driver is needed to provide a low-level operating system support for the MixW RigExpert. After installing the driver, the device appears to the system as an extra *COMxx* port (in addition to any existing COM ports).

   The Virtual COM Port is created by the driver for internal use only. This means that you can not use this "COMxx" with software which does not support the MixW RigExpert device directly.

3) Set up Virtual Serial Port number and parameters according to the Driver Configuration Guides (see pages 9, 10).

4) Connect MixW RigExpert to your transceiver using the supplied transceiver cable. Please **turn off** your transceiver while doing this. Perform this step carefully, since incorrect cable connection **may harm** the MixW RigExpert device or your transceiver.

5) Set up MixW2 or DigiPan software as described on pages 11, 12.

6) For using software other than MixW2 and DigiPan, please see READIO driver description on page 12.

7) For remote operation, please see the TEOAN software description on page 13.

8) For additional info, see the appendices.

There is some other useful info on the www.mixw.net/RigExpert/ website and on the supplied disk:

- Set-up troubleshooting
- Transceiver cables for most popular transceiver models
- Designing transceiver cables guide
- MixW RigExpert command set
- Programming samples and demos
- Firmware updates
- Hardware mods
- RigExpert family product matrix

Driver Installation Guide (Windows XP, Windows 2000)

This guide describes Windows XP case. Windows 2000 setup is similar.

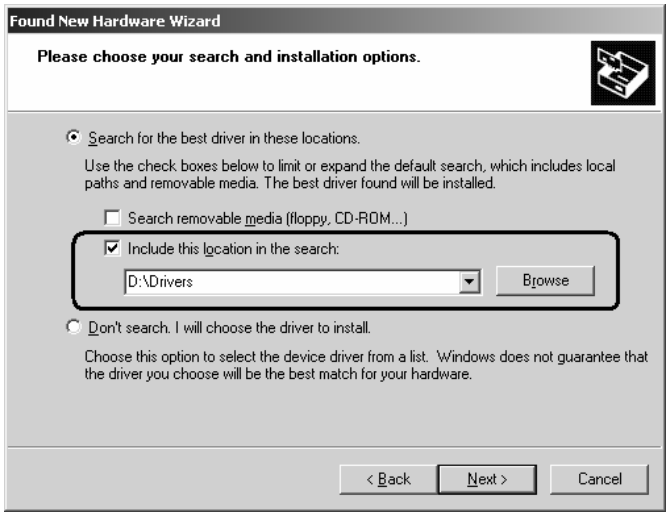
1. After the MixW RigExpert device is plugged into the computer USB port, a ***Found New Hardware (USB Serial Port)*** window will pop up on the computer screen.

2. A few seconds later, the ***Found New Hardware Wizard*** will start.

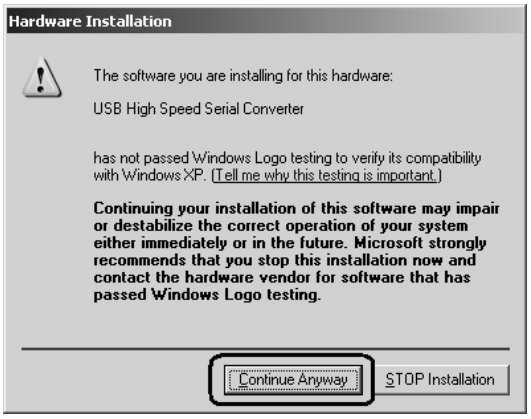
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
USB <-> Serial
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Select ***Install from a list or specific location (Advanced)*** and click ***Next*** to continue.

3. In the next window, check ***Include this location in the search*** and click ***Browse*** to browse for the drivers directory (on the supplied disk or on your hard disk). Click ***Next*** to continue.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\Drivers
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

4. Click ***Continue Anyway*** if you see ***"The software... has not passed Windows Logo testing ..."*** pop-up window.


Hardware Installation
The software you are installing for this hardware:
USB High Speed Serial Converter
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

5. In the ***Completing the Found New Hardware Wizard*** window, click ***Finish***.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
USB High Speed Serial Converter
Click Finish to close the wizard.
< Back
Finish
Cancel

6. Please repeat steps 2-5 when Windows finds MixW RigExpert subdevices.

7. Continue with driver settings when you see ***"Your hardware is installed and ready to use"*** message.

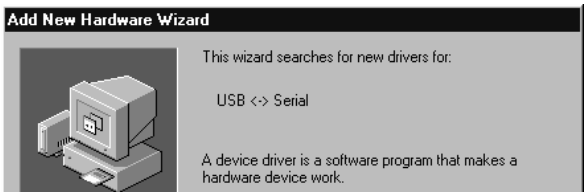
To **uninstall** the driver (if needed), please go to ***Control Panel*** (***Start*** button - ***Settings*** - ***Control Panel***). Click ***Add or Remove Programs*** icon.

Select ***FTDI USB Serial Converter Drivers*** from the list and click ***Change/Remove*** button. It is necessary to unplug the device during the uninstallation procedure.

Driver Installation Guide (Windows 98)

1. After the MixW RigExpert device is plugged into the computer USB port, a ***Found New Hardware (USB Serial Port)*** window will pop up on the computer screen.

2. A few seconds later, the ***Add New Hardware Wizard*** will start. Click ***Next*** to continue.


Add New Hardware Wizard
This wizard searches for new drivers for:
USB <-> Serial
A device driver is a software program that makes a hardware device work.

3. In the next window, select ***Search for the best driver for your device*** and click ***Next***.

Add New Hardware Wizard
What do you want Windows to do?
Search for the best driver for your device. (Recommended).
Display a list of all the drivers in a specific location, so you can select the driver you want.
< Back
Next >
Cancel

4. Check ***Specify a location*** and click ***Browse*** to browse for the drivers directory (on the supplied disk or on your hard disk), then click ***Next*** to continue.

Add New Hardware Wizard
Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.
Floppy disk drives
CD-ROM drive
Microsoft Windows Update
Specify a location:
D:\Drivers\R9052151
Browse...
< Back
Next >
Cancel

5. Click ***Next*** when you see the ***"Windows is now ready to install…"*** window.

Add New Hardware Wizard
Windows driver file search for the device:
USB High Speed Serial Converter
Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.
Location of driver:
C:\DISTR\RE\DRIVERS\R9052151\FTDIBU
< Back
Next >
Cancel

6. In the ***"Windows has finished installing…"*** window, click ***Finish***.

Add New Hardware Wizard
USB High Speed Serial Converter
Windows has finished installing the software that your new hardware device requires.
< Back
Finish
Cancel

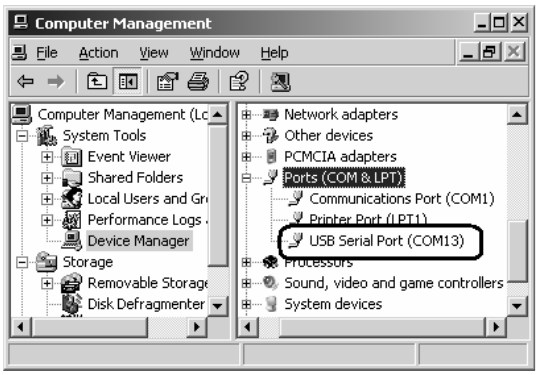
7. Please repeat steps 2-6 when Windows finds MixW RigExpert subdevices.

8. Now the drivers are installed and are ready to be configured (see page 10).

To **uninstall** the driver (if needed), please go to ***Control Panel*** (***Start*** button - ***Settings*** - ***Control Panel***). Click ***Add/Remove Programs*** icon.

Select ***FTDI USB Serial Converter Drivers*** from the list and click ***Change/Remove*** button. It is necessary to unplug the device during the uninstallation procedure.

1. As a result of successful installation, you will see a new serial port in the ***Device Manager*** (right-click ***My Computer*** on the desktop, select ***Manage*** from the menu, select ***Device Manager*** from the list on the left side of the window, then open ***Ports (COM&LPT)*** branch on the right).



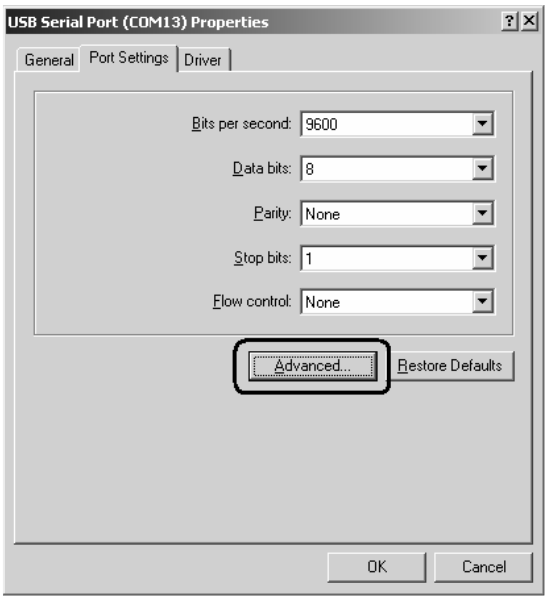
2. Please write down this port number (from step 1) on a piece of paper:

RigExpert port: COM13

This number will be needed later to set up your software.

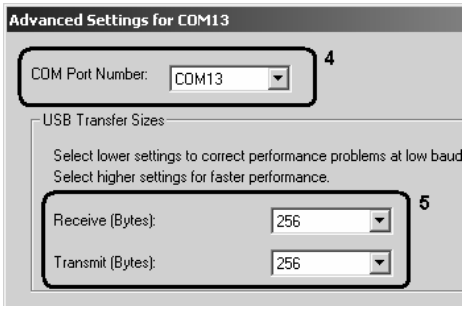
3. **Changing serial port number**

The serial port number is assigned automatically during driver installation. If you need to change its value, right-click the ***USB Serial Port (COMxx)***, select ***Properties*** from the menu. In the ***USB Serial Port (COMxx) Properties*** dialog, activate ***Port Settings*** tab, then click ***Advanced*** button.



4.**Changing serial port number (continued)**

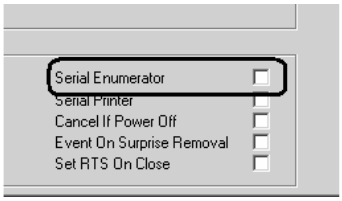
In the newly-open ***Advanced Settings for COMx*** dialog, select a new ***COM Port Number***.



5. **Changing USB Transfer Sizes**

If the MixW2 waterfall is jerky with MixW RigExpert, please set the ***Receive (Bytes)*** parameter (see the picture above) to the lower value (64 to 512). Use higher values to decrease processor load. You will need to unplug the MixW RigExpert device and then plug it back to accept this setting after closing the ***Advanced Settings for COMx*** dialog.

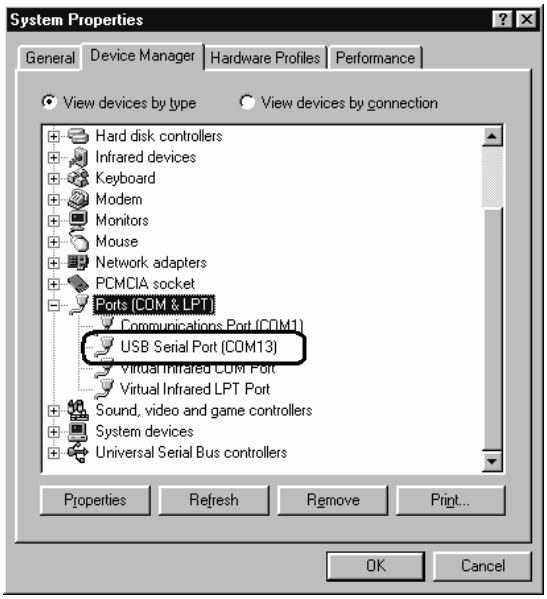
6. Uncheck the ***Serial Enumerator*** check-box (still in ***Advanced Settings for COMx*** dialog). This will disable modem and mouse enumeration procedure for this port and will decrease Windows start-up time.



Click ***OK*** to apply new settings and close the ***Advanced Settings for COMx*** dialog.

Driver Configuration Guide (Windows 98)

1. As a result of successful installation, you will see a new serial port in the ***Device Manager*** (right-click ***My Computer*** on the desktop, select ***Properties*** from the menu, then select ***Device Manager*** tab in the ***System Properties*** dialog. Open ***Ports (COM & LPT)*** branch in the device tree.)

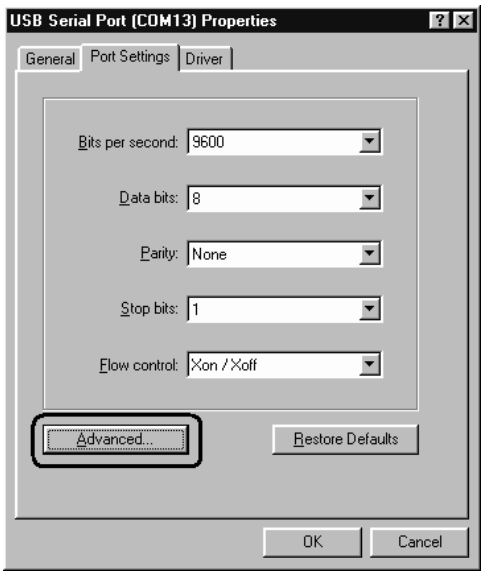


2. Please write down this port number (from step 1) on a piece of paper (this number will be needed later to set up your software):

RigExpert port: COM13

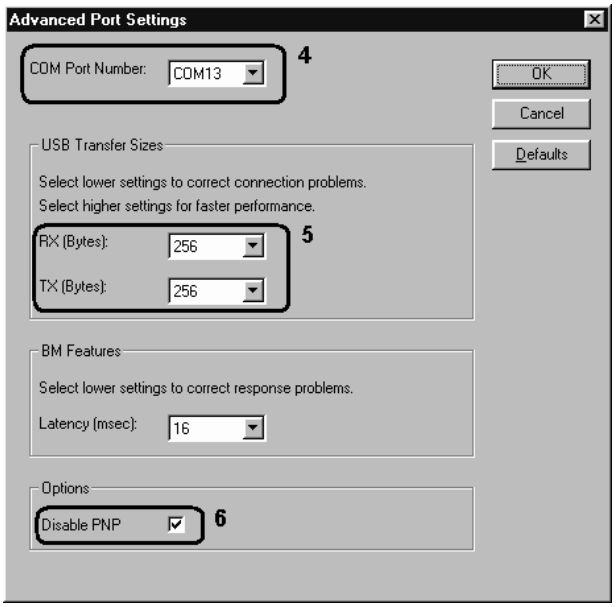
3. **Changing serial port number**

The serial port number is assigned automatically during driver installation. If you need to change its value, right-click the ***USB Serial Port (COMxx)***, select ***Properties*** from the menu. In the ***USB Serial Port (COMxx) Properties*** dialog, activate ***Port Settings*** tab, then click ***Advanced*** button.



4.**Changing serial port number (continued)**

In the newly-open ***Advanced Port Settings*** dialog, select a new ***COM Port Number***.



5. **Changing USB Transfer Sizes**

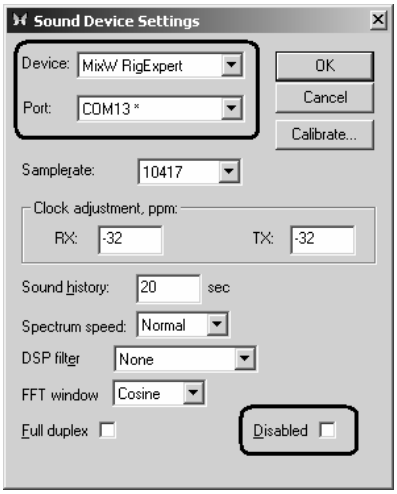
If the MixW2 waterfall is jerky with MixW RigExpert, please set the ***RX (Bytes)*** parameter (see the picture above) to the lower value (64 to 512). Use higher values to decrease processor load. You will need to unplug the MixW RigExpert device and then plug it back to accept this setting after closing the ***Advanced Port Settings*** dialog.

6. Check the ***Disable PNP*** check-box (still in ***Advanced Port Settings*** dialog, see the picture above). This will disable modem and mouse enumeration procedure for this port and will decrease Windows start-up time.

Click ***OK*** to apply new settings and close the ***Advanced Port Settings*** dialog.

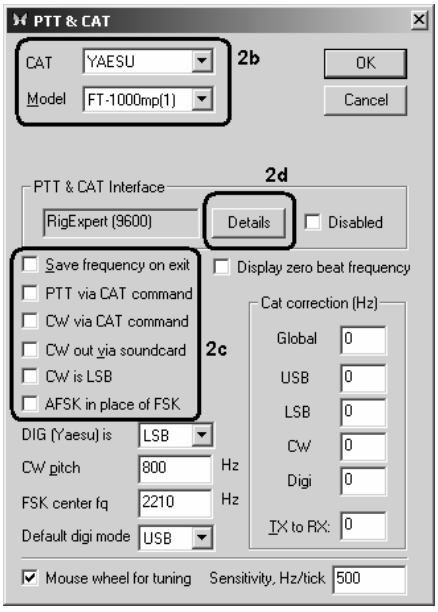
Setting up MixW 2 software to operate using MixW RigExpert

1. Run MixW 2 and open the ***Sound Device Settings*** dialog from ***Configure*** menu. Choose "***MixW RigExpert***" as a device type, then select the port number. ***COMxx*** is a virtual COM port number the VCP driver has created (see the driver installation guide for finding the ***COMxx*** value). Perform other sound device settings, if needed.



Note: Removing MixW RigExpert device when MixW 2 is running will disable audio in/out. ***Disabled*** *check-box will be automatically checked (see the picture above). To re-enable audio in/out when MixW RigExpert is plugged in back, click the* ***Disable soundcard*** *item from* ***Configure*** *menu or uncheck the* ***Disabled*** *check-box in the* ***Sound Card Settings*** *dialog.*

2a. Go to ***Configure – TRCVR CAT/PTT*** menu to open the ***PTT & CAT*** dialog.



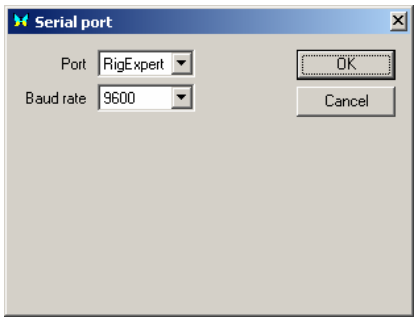
2b. Select your transceiver type and model (see the ***PTT&CAT*** dialog above).

2c. Perform additional settings according to MixW2 manual.

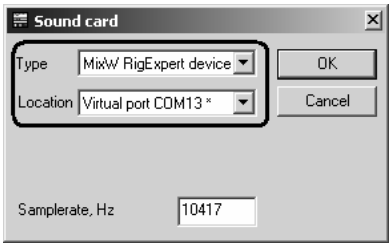
- To use CW output from MixW RigExpert, uncheck the ***CW out via soundcard*** check-box.
- For using FSK mode with MixW RigExpert, uncheck the ***AFSK in place of FSK*** check-box.

2d. Click ***Details*** to configure the CAT serial port.

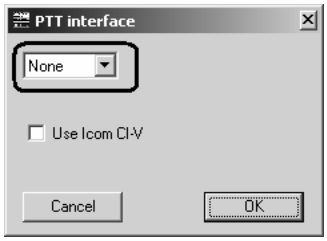
3. In the ***Serial Port*** dialog, select "***RigExpert***" as a ***Port***, then set the baudrate according to your transceiver manual.



1. Run DigiPan and open the ***Sound Card*** dialog from ***Configure*** menu. Choose "***MixW RigExpert device***" as a sound card type, then select the port number. ***COMxx*** is a virtual COM port number the VCP driver has created (see the driver installation guide for finding the ***COMxx*** value).



2. Go to ***Configure*** – ***Serial port*** menu to open the ***PTT interface*** dialog.



READIO – the MixW RigExpert virtual sound card

Using the READIO driver, MixW RigExpert becomes a standard sound card, making possible operating digital modes with any sound card software. It was tested with MixW2, DigiPan, MMTTY, MMSSTV, MT63, STREAM, Hellschreiber, Argo and Domino programs.

The driver works under Windows 2000/XP (should work under Windows 2003, but not tested yet).

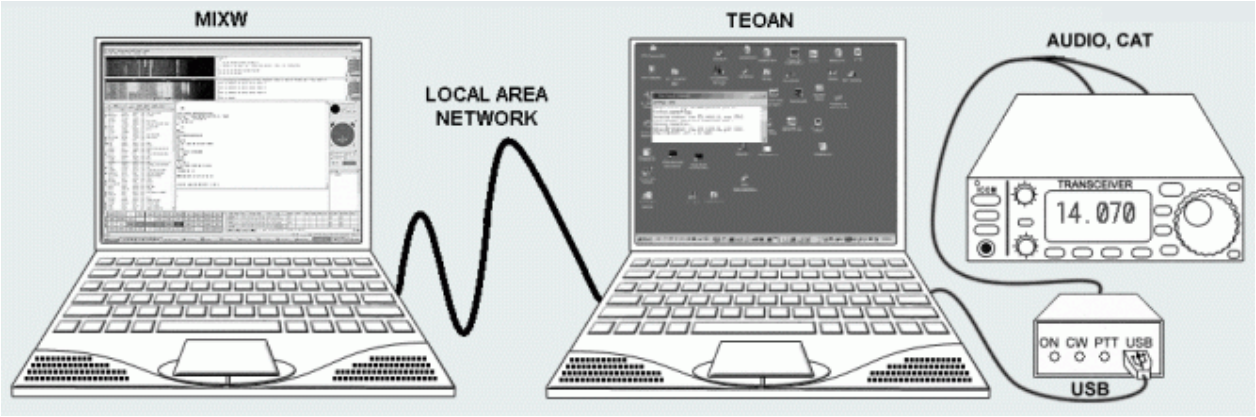
Supported functions: Audio in/out, CAT, PTT.

The driver files are located on the supplied disk (see the ***/Reaudio*** folder). Please see the ***readme.txt*** file for installation instructions.

The driver is also available in zipped format (unzip in a separate folder) on the www.mixw.net/RigExpert/ website.

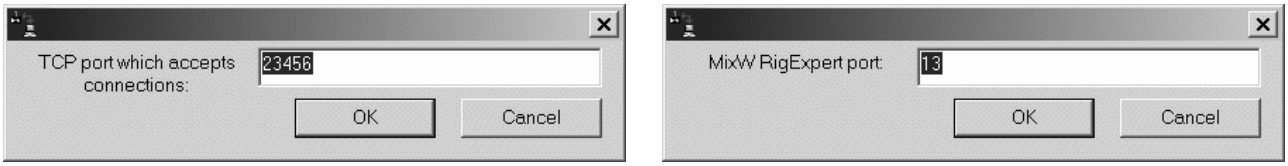
MixW 2.12 and later versions offer a unique feature of connecting a PC with TEOAN program and MixW RigExpert plugged to a transceiver into a local area network.

Then, running MixW 2.12 on another computer on a network (or via high-speed internet connection) makes possible operating digital modes using that remote transceiver.



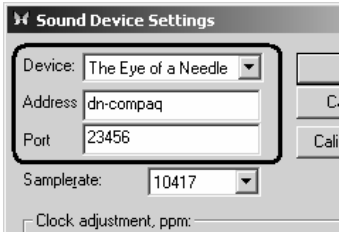
*Left side: computer (network name: **dn-acer**) running MixW software*
*Right side: computer (network name: **dn-compaq**) with MixW RigExpert connected.*

In the TEOAN program, set the virtual COM port number for MixW RigExpert and a TCP port number (the default value is OK in most cases).



*TEOAN settings at **dn-compaq** computer.*

In MixW2, choose "***The Eye of a Needle***" as an audio device. Enter an IP address or a name of the computer with TEOAN running, and the same TCP port value, like this:



*Please make sure that the CAT port speed is set properly. See the **TRCVR CAT/PTT** dialog from **Configure** menu.*

Note: the audio stream is not compressed, so no loss of quality is expected, but on the other hand the data rate is high, up to 0.4 Mbit/sec (RX or TX) or 0.8 Mbit/sec for TX in full duplex mode. Usual 10 Mbit LAN is good enough for this application, but slow modem connections will not be able to handle such a large stream of data.

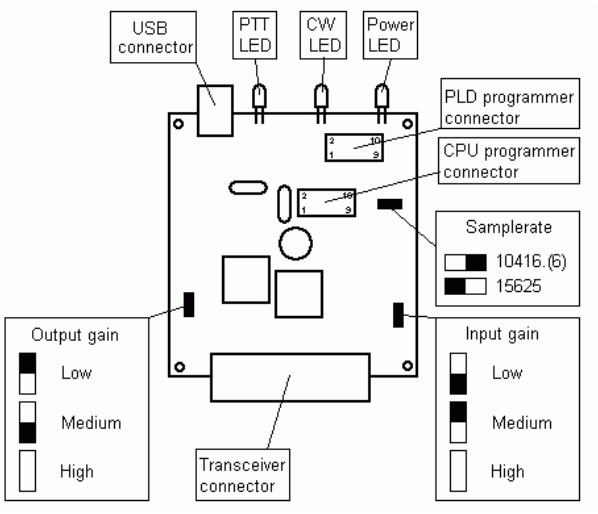
The TEOAN program is located in the MixW directory. Copy TEOAN.EXE from the computer with MixW installed to the other computer (create a separate directory).

Appendix A
Changing audio samplerate, audio input or output gain

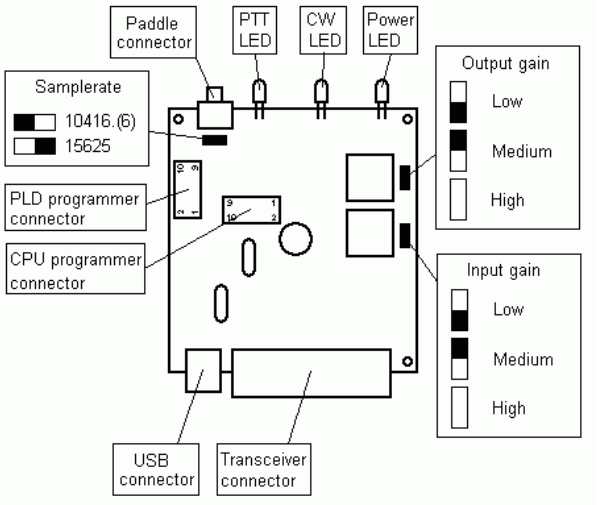
In some cases, it is necessary to change audio samplerate, audio input or output gain to satisfy transceiver requirements.

Open the MixW RigExpert plastic cover with a screwdriver. Find a corresponding jumper and set it to a new position according to these pictures. PCB (printed circuit board) version is marked on the board.

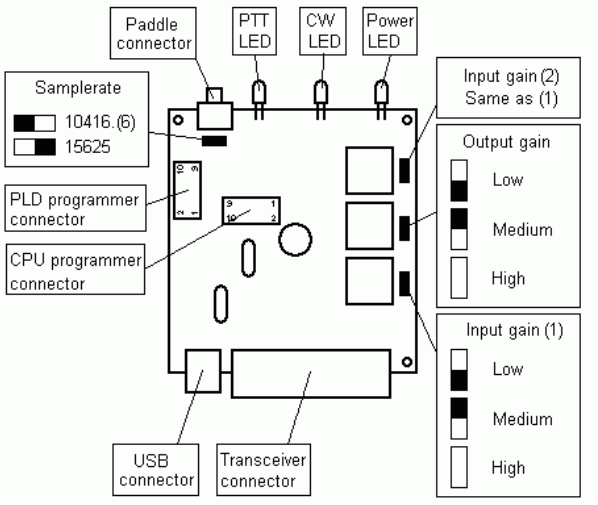
PCB version 1.xx



PCB version 2.1



PCB version 2.2



Appendix B
25-pin transceiver connector pinout

Pin	Pin name	Description
1	FSK_OC	FSK open-collector output
14	FSK_PULLUP	Pullup to +5V through 4.7K resistor
2	DIT	CW paddle input (dit), shorten to ground
15	DAH	CW paddle input (dah), shorten to ground
3	VCC	+5V output (USB power line)
16	PTT5V	TTL-level PTT output (5V in transmit, 0V in receive mode)
4	CW_OC	Open-collector CW output
17	PTT_OC	Open-collector PTT output
5	FSK12V	Reserved
18	12V_MAX	+12V output (generated by MAX232 chip)
6	SPK_TRCVR2	Reserved
19	RXD_OE *	Serial input (5V levels), connect RXD5V to VCC to activate this input
7	CIV_IN	CI-V input (ICOM transceivers), pulled up to 12V_TRCVR with 4.7K resistor
20	12V_TRCVR	Connect to VCC to power the CIV_IN input
8	CIV_OUT	CI-V open-collector output (ICOM transceivers), connect to CIV_IN
21	CO_PULLUP	Pullup to +5V through 4.7K resistor
9	TXD12V	RS-232-compatible serial output (±12V levels)
22	RXD12V	RS-232-compatible serial input (±12V levels)
10	TXD5V *	Serial output (5V levels)
23	RXD5V	Serial input (5V levels)
11	GND	Digital ground
24	GND	Digital ground
12	SPK_TRCVR	Transceiver audio output (speaker)
25	MIC_TRCVR	Transceiver audio input (microphone)
13	AGND_TRCVR	Audio signal ground

* - not available or non-working in some older MixW RigExpert devices. See the www.mixw.net/RigExpert/ website for details.

- For transceiver cable design guide and cable diagrams for most popular transceivers, please see the www.mixw.net/RigExpert/ website.

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